

DISTURBANCE OF MAMMAL TRAPS BY JACK RABBITS¹

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During studies of rodent populations at the Atomic Test Site, Mercury, Nevada, considerable disturbance of Young-type mammal traps occurred. After several months of trapping for three consecutive nights each month in a *Grayia spinosa* (Hooker) Moq. and *Lycium andersonii* Gray plant community, it was evident that the trap disturbance was somewhat systematic. On the basis of tracks, fecal droppings, and observance of the implicated animals, the disturbance was attributed to activities of black-tailed jack rabbits, *Lepus californicus deserticola* Mearns. The trapping design of 144 traps spaced at 75 foot intervals over a 15.6 acre grid, was for a study of rodents. When disturbance by the hares became a serious threat to the collection of rodents data, the trapping pattern was altered to determine their reactions and behavior as a prerequisite to their removal from the study area. Study plots in other plant communities were trapped in the same manner at similar times, but none was so heavily disturbed.

PROCEDURES AND RESULTS

Initially, many traps were sprung but not overturned. Assuming that hares were trying to enter the traps to obtain the oatmeal bait, all traps were closed and baited. The baited, closed traps were disturbed as frequently as those which were baited and left open. By the end of six consecutive nights of baiting, disturbance had increased considerably.

Source of stimulation for the disturbance was investigated by offering the hares both unbaited and baited traps. Relatively few of the unbaited traps were disturbed.

Bait was moistened, formed into small balls, dried, and placed in alternate traps. The bait balls could not pass through the screen of overturned traps, but were accesible to visual and olfactory senses. Other traps were baited with oatmeal flakes as usual. Relatively few of the traps with bait balls were disturbed.

Thirty-six baited traps were displaced 10 feet from their original positions and the traps around the perimeter of the study area next to established trails were baited. Another 36 traps were left in position beside the trails and made by us as we repeatedly walked through the quadrat. Both displaced and regularly placed traps were disturbed, although more of those by trails were disturbed than those away from trails.

In order to determine if the hares followed the straight lines of traps, 10 traps selected at random in the interior of the quadrat and all the perimeter traps were baited. Relatively more of the perimeter

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traps were disturbed than those randomly selected in the interior of the quadrat.

Table I. Disturbance of traps by jack rabbits in a 15.6 acre quadrat of 144 traps spaced at 75 foot intervals.

| Trapping and baiting plan | Condition of bait and traps | Average percentage of traps disturbed | Date (1961 unless indicated otherwise) |
|---------------------------|-----------------------------|---------------------------------------|--|
| 1. All baited | flakes - traps open | 41 | Sept.-Mar. (1960-61) |
| 2. All baited | " " closed | 43 | Jan. & Mar. |
| 3. None baited | " " | 5 | Jan. |
| 4. 72 alternates baited | " " " | 83 | Jan. & Feb. |
| 72 alternates not baited | " " | 2 | |
| 5. 72 alternates baited | " " " | 91 | Feb. |
| 72 alternates baited | balls " " | 22 | |
| 6. 36 displaced baited | flakes " " | 32 | Feb. |
| 36 in place baited | " " " | 59 | |
| 72 in place not baited | " " " | 0 | |
| 7. 44 perimeter baited | " " " | 86 | Feb. |
| 100 interior not baited | " " " | 0 | |
| 8. 44 perimeter baited | " " " | 92 | Feb. |
| 10 displaced baited | " " " | 46 | |
| 90 interior not baited | " " " | 2 | |

Time of activity was investigated by observing for trap disturbance immediately before sunrise and after sunset. No disturbance occurred during the daytime, but 69 per cent of the traps were disturbed during the night. Hares were observed morning and evening lying in hollows underneath the foliage of shrubs. At night they were seen moving within the quadrat. On one occasion, a hare was feeding on oatmeal next to an over-turned trap. During these observation periods of clear, calm weather conditions, their feeding activities apparently were strictly nocturnal.

DISCUSSION

Life history and population fluctuations of jack rabbits have been studied by Vorhies (1933), Philip *et al.* (1955), Woodbury (1955) Lechleitner (1958a), Adams and Adams (1959), and Bronson and Tiemeier (1959). Little has been published which adds to an understanding of their behavior. Lewis (1946) demonstrated the effectiveness of a strip of rye in affecting a barrier, and Bronson and Tiemeier (*op. cit.*) studied the relationship of precipitation to population response. Lechleitner (1958a and 1958b) studied habitat and environmental effects, alternation in home range, feeding preferences, and means of detecting food.

It is not known how the trap disturbance behavior was initiated in our study or why it became so extensive in such a limited area. Inasmuch as the disturbance did not begin until 24 days after the first traps were baited, it is possible that the hares learned the behavior during this interrun of repeated trapping. Similar traps disturbances occurred in other study areas, but to a much less degree. The high incidence of disturbance in this one area may have been due to a high population of hares, but this does not explain the lack of disturbance in other areas where populations of hares were equally high. Seasonal cycles may have an influence. During the season of our study, there may have been greater competition for food because of population increase resulting from the birth of young. However, during July and August when hare numbers were seemingly as high in other study areas, there was little trap disturbance.

Spatial distribution of hares was difficult to determine because we could not differentiate between individual hares, and usually only one was seen at a time. Although nine hares were eventually removed from the quadrat, at least one remained, resulting in no less than 10 in this single 15.6 acre plot. When little disturbance occurred, it was usually localized, suggesting activity of only one or two individuals.

Lechleitner (1958b) suggested that the sense of smell seemed to be used for identification of food. In our study, when inaccessible bait only was used, only a few traps were disturbed. This suggests an ability to differentiate between accessible and inaccessible bait. Disturbance of unbaited traps may have been due to odors from previous baitings or animal inhabitants.

With reference to trail influence, Lechleitner (1958b) stated that jack rabbits not only make trails, but follow those made by man's activities. In our studies, apparently a stimulus resulted from contact with trails, although traps placed away from trails were disturbed. Apparently the hares sought traps randomly, but if a distinct trail were found, it was followed in locating traps.

CONCLUSIONS

Following this sequence of experiments, the following theories are presented. (1) The hares responded to the bait inside the trap rather than the trap itself. (2) Their visual senses enabled them to detect traps with accessible bait and avoid traps with inaccessible bait. (3) Searching was not systematic until trails were approached, at which time they followed them in their search. (4) Their behavior was suggestive of a learning process. (5) Their activity was primarily nocturnal.

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